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10/519,857	08/15/2005	Eiji Atsumi	885A.0005.U1(US)	9280
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EXAMINER				
THOMAS, MIA M				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/519,857

Applicant(s)

ATSUMI ET AL.

Examiner

Mia M. Thomas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 9-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 9-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 February 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06 February 2009 has been entered.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 4, 9, and 10 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. Supreme Court precedent¹ and recent Federal Circuit decisions² indicate that a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claim recites a series of steps or acts to be performed, the claim neither transforms underlying subject matter nor is positively tied to another statutory category that accomplishes the claimed method steps, and therefore does not qualify as a statutory process.

The Applicant has provided no explicit and deliberate definitions of "receiving", "analyzing" or "responding" to limit the steps to the method of Claim 4.

¹ *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

² *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

Claim Objections

3. Claim 11 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 11 do not add or limit any steps or actions of Claim 1.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 3, 4, 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang (US 7,116,819) in combination with Juenger et al (US 5778106 A).

Regarding Claim 1: (Previously Presented-As best understood by the Examiner) Zhang teaches an apparatus ("An image processing apparatus for processing RGB image data output from an image capturing element including a primary-color filter..." at abstract; "FIG. 1 is a block diagram showing a structure of an image processing apparatus according to an embodiment of the present invention."), comprising:

a processor configured to perform first interpolation processing steps on input image data so as to prepare a first output image data (Refer to Figure 1; "a first RGB interpolation section (RGB

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interpolation section for extraction of middle-high range luminance component) 4..." at column 9, line 65);

and the processor further configured to perform at least one of a second interpolation processing step on data obtained in the removal process so as to prepare a second output image data (Refer to Figure 1, numeral 12; "a second RGB interpolation section (RGB interpolation section for generation of low-frequency luminance signal generation and color-difference signal) 12." at column 10, line 26)

Juenger teaches a retrieval module configured to intermittently remove at least a part of interpolation processing performed in the first interpolation processing steps from the first output image data ("A processed image is then constructed by processing the fewer than three color measurements known for each pixel to generate one or more interpolated color values at each of the pixel locations. A processed image is then created for rendering on an output device having a square raster with a second aspect ratio which differs from the first aspect ratio. The processed image is processed such that an aspect ratio of the original image captured on the non-square pixels is maintained on the output device." at abstract)

Zhang and Juenger are combinable because they are in the same field of image transformation and color correction, specifically interpolation.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to intermittently remove at least a part of interpolation processing performed in the first interpolation processing steps from the first output image data.

The motivation/suggestion for doing so would have been "substantially prevent[ing] color aliasing while preserving sharpness." Similarly, another suggestion to combine the teachings of Zhang and Juenger would have been "to provide an electronic imaging camera which interpolates sampled color image data in a manner that substantially reduces color fringing." at column 3, line 17+, Juenger.

Therefore, it would have been obvious to the skilled artisan to combine the teachings of Zhang and Juenger to obtain the specified claimed elements of Claim 1.

Regarding Claim 4: (Previously Presented) Claim 4 has claimed subject matter that equally resembles Claim 1. Claim 4 as stated is the claimed method steps in equivalence with the claimed apparatus of Claim 1. Claim 4 is rejected for the same reasons, motivation and rationale as rejected above at Claim 1.

Regarding Claim 3: (Previously Presented) Juenger teaches the retrieval module is further configured to recognize an arrangement pattern for color filters that are laid on the image sensor, ("The invention includes optimization of the pixel geometry for capability of balanced sharpness in each of two orthogonal sampling directions in the context of striped color filter arrays and dual resolution reconstruction." at column 3, line 61) to separate color elements of pixels generated during the first interpolation processing steps from color elements of pixels used to produce those color elements ("For example, many CCD's, as previously described, use colored stripes mechanically attached to the CCD to filter colors, thereby making individual pixels associated with only one color. These individual pixels are broken into color planes.

Therefore, if colored stripes of red, green, and blue ("RGB") are attached to the CCD, then the pixels associated with each individual color are broken into a red color plane, a green color plane, and a blue color plane." at column 3, line 65)

and to selectively perform the intermittent processing steps for the color elements of the pixels generated during the first interpolation processing steps ("Therefore, the next step is to interject interpolated image signals in each of the color planes that correspond to the image signal locations left void by the separation step. This now forms a triplet for each color location in the image. Previously, a single pixel location would contain only information on one color, red for example. Now, with the interpolated data, each pixel location has RGB information associated therewith." at column 4, line 9).

Regarding Claim 9: (Currently Amended) Juenger teaches the intermittent processes comprise a process performed on pixels that are interpolated by a color corrector so as to minimize affects due to a color correction process, (It is still another object of this invention to provide an electronic imaging camera in which sampled image data is interpolated to provide image data in all the colors for all the image sensing elements while minimizing color artifacts and preserving sharpness. It is still another object of this invention to provide an electronic imaging camera in which sampled image data is interpolated to provide image data in all the colors for all the image sensing elements while carrying lightness detail only from the originally sampled color value at each pixel location regardless of the original color." at column 3, line 26+);

Zhang teaches an image quality correction process that are performed by a camera digital signal processor (Refer to numerals 13 and 14; "The white balance adjustment section 13

adjusts the white balance with respect to the interpolated R-, G-, or B-components in each pixel according to the color temperature of light so as to correct the color of an image." at column 13, line 24; The present invention relates to an image processing apparatus for processing image data obtained by a CCD (charge-coupled device) area sensor having a primary-color filter so as to obtain a high quality image. Such an image processing apparatus is mounted on a digital camera (e.g., electronic still camera) or the like." at column 1, line 6)

an arbitrary color interpolation process (Refer to Figure 1, numeral 4) and an arbitrary image quality correction process that require an increased amount of operational processing and a greater amount of processing line memory than the removed interpolation step (Refer to Figure 1, numeral 12-17, specifically "In the second RGB interpolation section 12, interpolation is achieved by arithmetic operations using interpolation filters shown in FIGS. 5A and 5B. Color components interpolated by the second RGB interpolation section 12 and color components obtained by the color filter are combined so as to generate a second RGB image signal where all of R-, G-, and B-components are complete for each pixel. Specifically, the R- and B-component interpolation filter shown in FIG. 5A is used for R- and B-components, and the G-component interpolation filter shown in FIG. 5B is used for the G-component. Furthermore, in the G-component interpolation filter, it is required that an operation in the x-direction has priority over an operation in the y-direction." at column 12, line 30).

Zhang and Juenger are combinable because they are in the same field of image transformation and color correction, specifically interpolation.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to combine the teachings of Zhang and Juenger.

Further, it would have also been obvious to one of ordinary skill in the art to utilize an image quality correction process that is performed by a camera digital signal processor and an arbitrary color interpolation process and an arbitrary image quality correction process.

The motivation/suggestion for doing so would have been "the amount of noise included in a color-difference signal varies according to, for example, the quality of an image capturing element such as a CCD. Thus, by selecting an appropriate median filter according to the amount of noise, a color-difference signal with reduced noise can be generated." at column 18, line 43+, Zhang.

Therefore, it would have been obvious to the skilled artisan to combine the teachings of Zhang and Juenger to obtain the specified claimed elements of Claim 9.

Regarding Claim 10: (Previously Presented) Juenger teaches recognizing an arrangement pattern for color filters that are laid on the image sensor ("The invention includes optimization of the pixel geometry for capability of balanced sharpness in each of two orthogonal sampling directions in the context of striped color filter arrays and dual resolution reconstruction." at column 3, line 61) separating color elements of pixels generated during the first interpolation processes from color elements of pixels used to produce those color elements ("For example, many CCD's, as previously described, use colored stripes mechanically attached to the CCD to filter colors, thereby making individual pixels associated with only one color. These individual pixels are broken into color planes. Therefore, if colored stripes of red, green, and blue ("RGB")

are attached to the CCD, then the pixels associated with each individual color are broken into a red color plane, a green color plane, and a blue color plane." at column 3, line 65)

and selectively processing color elements of pixels generated during the first interpolation processes("Therefore, the next step is to interject interpolated image signals in each of the color planes that correspond to the image signal locations left void by the separation step. This now forms a triplet for each color location in the image. Previously, a single pixel location would contain only information on one color, red for example. Now, with the interpolated data, each pixel location has RGB information associated therewith." at column 4, line 9).

Regarding Claim 11: (Previously Presented) Okada teaches the apparatus of claim 1 embodied in an information terminal. (Refer to numeral 1; As is well known in the art, Okada teaches that "Generally, a digital camera that handles image information, which typically includes more data than character information, faces the problem that the capacity of the data recording medium can turn out to be insufficient, and reduction in file sizes is therefore desirable." at column 2, line 4 has been presented. Similarly at Figure 1, Okada teaches "The present invention pertains to a digital camera that records images as electronic digital data." at column 1, line 6.

6. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang (US 7,116,819) in combination with Juenger et al (US 5778106 A) and further in view of Okada (US 6,977,683).

Regarding Claim 2: (Currently Amended) Zhang teaches the processor configured to perform an arbitrary color interpolation processing step (Refer to Figure 1, numeral 4) and an arbitrary image quality correction step that require an increased amount of operational processing and a greater amount of processing line memory than the removed interpolation step (Refer to Figure 1, numeral 12-17, specifically "In the second RGB interpolation section 12, interpolation is achieved by arithmetic operations using interpolation filters shown in FIGS. 5A and 5B. Color components interpolated by the second RGB interpolation section 12 and color components obtained by the color filter are combined so as to generate a second RGB image signal where all of R-, G-, and B-components are complete for each pixel. Specifically, the R- and B-component interpolation filter shown in FIG. 5A is used for R- and B-components, and the G-component interpolation filter shown in FIG. 5B is used for the G-component. Furthermore, in the G-component interpolation filter, it is required that an operation in the x-direction has priority over an operation in the y-direction." at column 12, line 30).

an image quality corrector, (Refer to numerals 13 and 14; "The white balance adjustment section 13 adjusts the white balance with respect to the interpolated R-, G-, or B-components in each pixel according to the color temperature of light so as to correct the color of an image." at column 13, line 24);

and an image quality correction process that are performed by the camera digital signal processor: (The present invention relates to an image processing apparatus for processing image data obtained by a CCD (charge-coupled device) area sensor having a primary-color filter so as to obtain a high quality image. Such an image processing apparatus is mounted on a digital camera (e.g., electronic still camera) or the like." at column 1, line 6)

Juenger teaches a retrieval module wherein the retrieval module performs intermittent processing steps ("A processed image is then constructed by processing the fewer than three color measurements known for each pixel to generate one or more interpolated color values at each of the pixel locations. A processed image is then created for rendering on an output device having a square raster with a second aspect ratio which differs from the first aspect ratio. The processed image is processed such that an aspect ratio of the original image captured on the non-square pixels is maintained on the output device." at abstract)

Okada ('683) teaches: a camera module including a lens (Refer to Figure 1, numeral 2-"Image Pickup Lens") an image sensor ("A digital camera employs an image sensor..." at abstract; "a CCD equipped with color filters that separate the image signals into data of different colors..." at column 3, line 8) and a camera digital signal processor. (Refer to Figure 3, numeral 26-DSP/"Digital Signal Processing Circuit"), wherein the camera digital signal processor includes a color corrector, wherein the camera module produces the first output image data (Refer to Figure 1; numeral 5- "a signal processor 5"; "of the digital signals obtained by means of the components described above, a first memory 6 that temporarily stores the image data that has undergone signal processing in the signal processor 5..." at column 3, line 14); a gamma corrector ("gamma correction..." at column 3, line 13) a color interpolator ("For example, note at Figure 4, see beneath the arrow that states-"Color Separation and Interpolation"—Specifically, see Figure 7-"Filter Alignment Data"),

Zhang, Juenger and Okada are combinable because they are in the same field of image processing including color correction and removal or suppression.

At the time that the invention was made, it would have been obvious to one of ordinary skill in the utilize a camera module including a lens, an image sensor, a camera digital signal processor, color corrector, wherein the camera module produces the first output image data, a gamma corrector, and a color interpolator.

The suggestion/motivation for doing so would have been "The DSP 26 (FIG. 3) processes the digital signals from the A/D converter 24 so as to provide a demosaic function, and also performs automatic white balance detection and correction, as well as image sharpening functions in accordance with well known techniques." at column 4, line 26 (Okada).

Also the simple substitution of *white balance adjustment* for *color correction means* would yield the same results to one of ordinary skill in the art. The substitution of white balance adjustment for color correction means would have also been an obvious substitution because the prior art contains elements that do not differ in scope and the substitution of these elements have the same well known function and are also well known in the art.

Okada exemplifies a diagrammatic explanation of these claimed elements and the illustrations of Okada as set forth in this rejection shown diagrammatically at each claimed element the description of these elements.

While Zhang, Juenger and Okada can be combined, the prior art elements according to the known methods of an "apparatus" having a camera module with a camera DSP would yield predictable results through the combination of Zhang, Juenger and Okada.

All the claimed elements have no change in their respective functions and the combination of Zhang, Juenger and Okada would have yielded predictable results to one of ordinary skill in the art at the same time of the invention.

Response to Arguments

7. Applicant's arguments, with respect to 35 USC 112, second paragraph, at page 5 of applicant's remarks have been fully considered and are persuasive. The rejection of claims 2 and 9 has been withdrawn.

8. Applicant's arguments with respect to claim 1 as detailed at pages 5-7 have been considered but are moot in view of the new ground(s) of rejection.

Summary of Remarks: For at least the reasons stated above at pages 5-7, the applicant's contend that the rejection of Claim 1 is improper and the rejection should be removed. Tariki and Zhang can not be seen to disclose or suggest performing first interpolation processing steps on input image data so as to prepare a first output image data and intermittently removing at least a part of the interpolation processing performed in the first interpolation processing steps from the first output image data so as to perform a second interpolation processing step on data obtained in the removal process.

Examiner's Response: The Examiner maintains that Zhang teaches a first interpolation process as detailed at Figure 1, numeral 4 of the prior art teaching. Zhang in combination with Juenger teaches the claimed elements of intermittently removing at least a part of the interpolation

processing performed in the first interpolation processing steps (as rejected above). Since Tariki and Zhang in combination does not expressly teach these claimed elements a new grounds of rejection has been forwarded with respect to the combination of Zhang and Juenger. (see rejection above). All the claimed elements were known in the prior art at the time of the invention. The skilled artisan could have combined the teachings of Zhang and Juenger to obtain the specified claimed elements of independent claims 1 and 4.

With regards to claims 2-3, 11, 9-10 which depend from Claim 1 and 4 a new grounds of rejection has been forwarded with respect to the newly rejected claims 1 and 4 from which claims 2-3, 9-11 depend.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mia M. Thomas whose telephone number is (571)270-1583. The examiner can normally be reached on Monday-Thursday 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mia M Thomas/

Examiner, Art Unit 2624

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